Novel High Temperature Membrane for PEM Fuel Cells, Phase I

Completed Technology Project (2004 - 2005)

Project Introduction

The innovation proposed in this STTR program is a high temperature membrane to increase the efficiency and power density of PEM fuel cells. The NASA application is newly emerging electric aircraft propulsion systems. The proposed membrane is based on novel proton conducting polymeric materials that will not require humidification or the use of leachable dopants to enhance proton transport. Operation of fuel cells at temperatures > 150 ?C will facilitate heat and water management, increase the current density, and reduce the over-potentials for hydrogen oxidation and oxygen reduction. These advantages will translate to lower power system weight for propulsion applications through reduced fuel cell system size and improved fuel economy. The high temperature membranes will be based on new polymer materials recently discovered at the University of Michigan (UM). In this program T/J Technologies will collaborate with UM to transfer this technology into fuel cell applications through developing blends or copolymers designed to improve fuel cell performance. T/J Technologies will modify casting and fabrication methods for the new membrane materials. The overall goal of phase I is to demonstrate a novel membrane that is mechanically, thermally and chemically robust at >150 ?C and attains a proton conductivity > 0.1 S/cm2.

Primary U.S. Work Locations and Key Partners

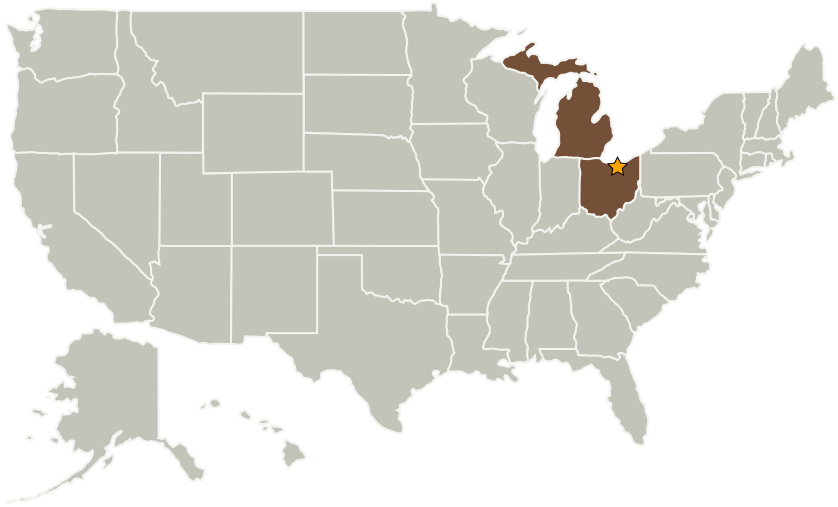

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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
T/J Technologies, Inc.	Supporting Organization	Industry	Ann Arbor, Michigan

Primary U.S. Work Locations	
Michigan	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Hanwei Lei

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.2 Electrochemical: Fuel Cells